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which I observed did not, however, resume the dark-brown color, but remained of a uniform pale-cream color, lighter on sides, under parts, and between the segments of the dorsum.

Occasionally during the adult state the one which I kept through the winter showed signs of luminosity on the prothoracic segment, but mainly shone as represented in Fig. 1. The other one exhibited no sign of luminosity on the pro- and meso-thoracic segments. Otherwise it was like Fig. 1. Professor Riley, seven years ago, figured a similar phosphorescent insect,<sup>\*</sup> and in the paper, read before the Washington Entomological Society, he says that one found by him in 1869 was figured in Le Baron's fourth Illinois report.

The males are insignificant when compared to the females in size and beauty. They are 15 mm. to 20 mm. in length. Antennæ plumose, and half, or more than half, as long as the body. The elytra are short, thin, and subulate.—*Geo. F. Atkinson, University of North Carolina, Chapel Hill, July 7, 1887.*

#### ZOOLOGY.

**The Irish Marine Fauna.**—The *Proceedings of the Royal Irish Academy* (vol. iv. of the second series) contains two preliminary reports on the marine fauna of Ireland. One is by Prof. Alfred Haddon, and treats of the fauna of Dublin Bay. The other is the report of the Committee on the Marine Fauna of South-western Ireland, and gives an account of their explorations, the different groups being treated by specialists, in a manner similar to that adopted by the Liverpool committee. There is abundant room for similar work on the American shores, but the policy of centralization adopted by the United States Fish Commission has a discouraging effect.

**Von Lendenfeld on Sponges.**—Dr. R. von Lendenfeld has an extensive paper on the "Position and Classification of Sponges" in a recent part of the *Proceedings of the Zoological Society of London*. His views on most points are similar to those of Vosmaer. On account of the absence of a cœlom, he regards them as true members of the Cœlenterata,—a group which he divides into two phyla, Mesodermalia, embracing the sponges, and Epithelaria, including the true Cœlenterates of other authors. He regards the mesoderm of the sponges as a modification of the mesogloea of the Cœlenterates, and homologous with it. His definition of the Mesodermalia is "Cœlenterata with permeating canal-system, and organs developed from the cells of the mesogloea, or primary mesoderm. No movable appendages." This phylum has but a single class, Spongixæ, which is subdivided as follows:

<sup>\*</sup> American Entomologist, vol. iii.; new series, vol. i., 1880, p. 202.

## I. Sub-Class Calcarea.

## 1. Order Calcispongiaë.

- i. Sub-Order Homocœla, with the families Asconidæ, Homodermidæ, and Leucopsidæ.
- ii. Sub-Order Heterocœla, with the families Syconidæ, Sylleibidæ, Leuconidæ, and Teichonidæ.

## II. Sub-Class Silicea.

## 1. Order Hexactinellida.

- i. Sub-Order Lyssacina, with the families Euplectellidæ, Asconematidæ, Rossellidæ, and Hyalonematidæ.
- ii. Sub-Order Dictyonina, with the families Farreidæ, Euretoidæ, Melittionidæ, Coscinoporidæ, Tretodictyidæ, and Meandrospongidæ.

## 2. Order Chondrospongiaë.

- i. Sub-Order Tetraxonia, with the families Rhizomorinidæ, Anomocladinæ, Tetracadinidæ, Corticidæ, Pachystrellidæ, Plakinidæ, Oscarellidæ, Geodidæ, Stellettidæ, Theheidæ, Tetillidæ, and Tethyopsyllidæ.
- ii. Sub-Order Monaxonida, with the families Tethydæ, Sollasellidæ, Spirastrellidæ, Suberamatidæ, and Suberitidæ.
- iii. Sub-Order Oligosilicina, with the families Chondrillidæ and Chondrosidæ.

## 3. Order Cornacuspongiaë.

- i. Sub-Order Halichondrina, containing the families Spongillidæ, Homorhaphidæ, Heterorhaphidæ, Desmacidonidæ, and Axinellidæ.
- ii. Sub-Order Keratosa, with the families Spongidæ, Aplysinidæ, Hircinidæ, Spongelidæ, Aplysillidæ, and Halisarcidæ.

These families and major groups are all characterized, as are also the sub-families recognized. In each the more important genera are mentioned. The article concludes with a nearly exhaustive bibliography of the literature of recent sponges, no less than sixteen hundred and fifty-four titles being enumerated. The latest bibliography previous to this (that of D'Arcy Thompson, 1883) contained five hundred and fifty-one titles. In this connection the student should consult the *errata* given by Von Lendenfeld in the *Zool. Anzeiger*, No. 254.

**Note on the Ctenidium of *Unio aberti* Conrad.**—In January of the present year a gentleman resident in Kansas sent me several living specimens of *Unio aberti* Conrad, just then collected in Fall River, in that State. One of these specimens proved to be a female, the ctenidia of which were surcharged with developing young. It was particularly interesting, however, because of a modification of the branchial uteri, which has been hitherto noticed but once in any species of *Unio*.

Dr. Lea, in a paper read before the American Philosophical Society in early November, 1827, described both the shell and soft parts of *Unio irroratus*, a species then first made known. This paper was published, with figures, in vol. iii., *Transactions*

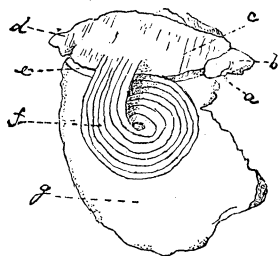


FIG. 1.—Explanation: “a, mouth; b, great anterior muscle; c, superior right branchiæ; d, great posterior muscle; e, inferior right branchiæ; f, right oviduct; g, foot.”

*American Philosophical Society*, Plate V., 1827. The general physiological character of the ctenidium, as thus peculiarly modified, appears to have been fully understood by Dr. Lea, but its structural relation appears to have been misinterpreted and to have been regarded as an appendage of the branchiæ, and hence as being morphologically distinct. He thus writes, pages 270–271, *loc. cit.*: “In those I observed an appendage, in form of a depressed cone, attached to the branchiæ on either side, and a very slight examination fully satisfied me these were the oviducts. . . . The long sacks containing the ova are inserted

about half-way up the branchiæ and somewhat posterior to the centre. The number of these sacks in my three specimens consists of eight in two and seven in the other.” In Fig. 1 is given a copy of Mr. Lea’s figure of this structure, seen in external view.

Now, it is evident that these “sacks” instead of being appendages to, are really the elongated chambers of the ctenidia, functionally active as brood-pouches. The properly so-called oviduct of *Unio* is not well known, though the position of the genital opening leading from the gonads—whether they be ovaries or spermaries—is well known. The terms oviduct, as used by Mr. Lea, and ovaries, as commonly applied to the surcharged ctenidia, are, therefore, not only incorrect but misleading.

Hitherto the peculiar feature noticed in *Unio irroratus* has not been found in any other species in the genus, but it now finds an instructive counterpart in Conrad’s species. As shown in Fig. 2, the anterior chambers of the ctenidium, *i*,—all of which are filled with young,—are directed ventrad and backwards in a flowing curve; but as the median chambers become filled they are recurved and thrown outwards. This recurving gives to the ctenidium the appearance which Mr. Lea described as a “depressed cone.” The final result is an irregular intercoiling and crowding of the more posterior chambers, which are less than one-half the diameter of the anterior ones. The chambers are, without exception, very long cylindrical distally closed tubes, with a somewhat less diameter at point of origin than at extremity. Their walls, which are exceedingly thin and readily ruptured, are further somewhat protected by a transparent and

somewhat gelatinous membrane, which invests the entire ctenidium and serves to aid in holding the chambers in place.

In this specimen the young found in the anterior chambers were in a more advanced stage of development than were those in the most posterior chambers. It would appear that the ova are discharged through the genital opening into the innermost branchial cloaca and pass thence, being fertilized *in transitu* and moving with the cœlomic fluids, into the outer cloaca, whence they fill the chambers, often distending them to four and five times their normal diameter. Furthermore, in nearly if not quite all the species of *Unio* which have come under our personal observation, the anterior median chambers of the ctenidia appear to be first charged with ova. The process continues, successively extending towards the posterior extremity of the outer branchiæ until, in most if not all

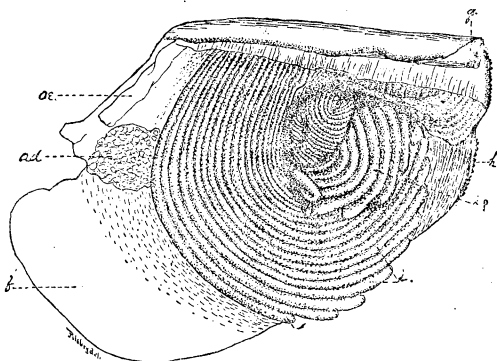


FIG. 2.—Explanation: *Oe*, oesophagus. The triangular labial palps have been removed. *ad*, anterior adductor muscle, in transverse section. *f*, foot. *i*, cylindrical chambers of the ctenidium. *ip*, excurved portion of medial chambers. *h*, siphonal tentacles. *g*, mantle, folded on itself above, to show junction of ctenidium.

species, both nearly entire external ctenidia function as brood-pouches. My observation has been that the process of development is, to a certain degree at least, independent of temperature conditions, for I have taken specimens of *Unio* at all seasons of the year with the young in all stages of development.

It may not be out of place here to note that no byssus organ, such as is found in the glochidium larva of *Anodonta*, has ever been observed by me in the examination of numerous embryonic forms of many species of *Unio*. The byssus which is seen in certain related species—e.g., *U. rubellinus*, *U. acutissimus*, *U. conradianus*, *U. parvulus*, and *U. penicillatus*—is gelatinous in nature and not chitinous, and lasts, at least in the Coosa and Cahawba Rivers, throughout the life of the individual.

An unfortunate duplication of species on the part of the writer ought, perhaps, to be mentioned here. In 1850, in *Proc. Phila. Acad. of Natural Sciences*, vol. v. p. 10, Mr. T. A. Conrad described *Unio aberti*, from the Verdigris River, Arkansas. The final description, with figures, appeared in the *Four. Phil. Acad. Natural Sciences*, 2d series, vol. ii., Pl. XXIV., Fig. 1 (1851). Two

years later, in 1852, Dr. Lea described the same form under the name of *U. lamarckianus*, with figures, in the *Trans. Am. Phil. Soc.*, 2d series, vol. x., Plate XVII., Fig. 20. His figure is imperfect in that the characteristic roughened surface with more or less depressed folds is not shown, though mentioned casually, in the description. This circumstance, added to the fact that then I had not seen either the description or figure of Conrad's species, led me into the error of redescribing in 1885, as new, this same species under the name of *U. popenoi*, the specimens coming from the Fall and Verdigris Rivers, Kansas. *Vide* "Bulletin Washburn Coll. Lab. Nat. Hist.," vol. i. No. 2, pp. 48, 49, Pl. II., 1885. There is no reasonable doubt, however, but that the last described form is the female of *U. aberti*,—Conrad's description and figure being based upon the half-grown male form. The synonymy will therefore stand as follows: *Unio aberti*, Conrad (1850). *Unio lamarckianus*, Lea (1852). *Unio popenoi*, Call (1885).—*R. Ellsworth Call*.

**Zoological News.**—WORMS.—Miss A. M. Fielde, of Swatow, writes to the Philadelphia Academy (*Proceedings*, p. 115, 1887) describing some observations made on the life-history of a Chinese liver-fluke. One snail examined by her was the host of at least ten thousand young Distomæ, while another individual had the liver almost wholly replaced by a *Redia* of the same parasite.

Mr. A. G. Bourne gives (*Proc. Zool. Soc. London*, 1886 [1887]) a preliminary account of some Indian earth-worms belonging to the families Perichætidae and Moniligastridae. Eight belong to the genus *Perichæta*, one to *Perionyx*, and seven to *Moniligaster*. The species of *Perionyx* (*P. saltans*) has the power of leaping into the air when touched. Bourne says that the huge earth-worm mentioned by Darwin as occurring on the Nilgherries turns out to be a species of *Moniligaster* described by Perrier as *M. deshayesii*.

The first part of the fourth volume of Bronn's "Klassen und Ordnungen der Thierreichs" has appeared. The volume will be written by Dr. A. Pagenstecher. The present part gives an historical account of the literature of Vermes, and contains three plates illustrative of the Dicyemidae, the figures being taken mostly from the papers of Whitman and Van Beneden.

**CRUSTACEA.**—Bernhard Rawitz has a paper (*Arch. f. mikr. Anat.*, xxix.) on the green gland of the crayfish. The article treats wholly of histology, and contains no comparisons or morphological suggestions. The most important point brought out is that the gland consists, in reality, of two (not one) convoluted tubes, the two uniting a short distance behind the external opening of the common duct.

FISHES.—Miss Rosa Smith has described a new species of balloon-fish (*Tetraodon setosus*) in the *Bulletin of the California Academy* (vol. ii.). It is based on a dried skin brought from Mexico.

BATRACHIA.—At the meeting of the Zoological Society of London held June 7, 1887, Prof. G. B. Howes read a paper showing that in some of the anurous Batrachia there exists a structure which appears to correspond to the mammalian epiglottis, and which, in some species, becomes well developed as an organ of voice.

REPTILIA.—Prof. O. P. Hay gives (*Four. Cincinnati Nat. Hist. Socy.*, x. pt. 2) a preliminary catalogue of the Batrachia and Reptilia of Indiana. Seventy-seven species are enumerated.

BIRDS.—W. E. Bryant publishes, in the *Bulletin of the California Academy of Sciences*, some additions to the ornithology of Guadeloupe Island. There were previously known but eight birds from this locality, but Mr. Bryant catalogues thirty-five species and sub-species.

The ostrich in the Cincinnati Zoological Gardens is dead. Mr. Charles Dury, in an account of the death, states that the bird broke its leg in an attempt to lay an abnormal egg. The ordinary ostrich-egg measures about five by six and one-quarter inches, but this one consisted of a normal egg as a centre, and around this there were about twenty leathery layers, the whole measuring about thirteen by eighteen inches.

MAMMALS.—Dr. Ch. Lütken, of Copenhagen, states that probably the habitat of the rare *Chiropodomys penicillatus* is Java, the Copenhagen Museum having received one in spirit from Bintenzorg. He also says, on the authority of Dr. H. Winge, that the city museum of Genoa has several specimens from the same locality.

F. E. Beddard publishes an account of the visceral anatomy and the brain of the Sondaic rhinoceros in vol. xii. of the *Transactions of the Zoological Society of London*. The only previous paper on the anatomy of this species was by the late Mr. Garrod.

The second "Cunningham Memoir" of the Royal Irish Academy is by Prof. D. J. Cunningham, and treats of the lumbar curve in man and apes, as well as of the topographical anatomy of the anthropoid apes. It is illustrated with thirteen plates, some of them colored.

A preliminary notice of a paper by Oldfield Thomas, on the "Homology and Succession of the Teeth in the Dasyuridæ," appears in No. 254 of the *Proceedings of the Royal Society*. In it the author presents an outline of a scheme of homology of the teeth, into which all mammals except the Edentates readily fit.